Fast-Spin echo

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☐ 1. Document ID: US 5825185 A Relevance Rank: 72

L2: Entry 2 of 3 File: USPT Oct 20, 1998

US-PAT-NO: 5825185
DOCUMENT-IDENTIFIER: US 5825185 A

TITLE: Method for magnetic resonance spin echo scan calibration and reconstruction

DATE-ISSUED: October 20, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Liu; Haiying	Minneapolis	MN		
Bearden; Francis H.	Twinsburg	OH		
DeMeester; Gordon D.	Wickliffe	OH		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Picker International, Inc.	Highland Heights	OH			02

APPL-NO: 8/ 757153
DATE FILED: November 27, 1996

INT-CL: [6] G01V 3/00
US-CL-ISSUED: 324/309; 324/307
US-CL-CURRENT: 324/309; 324/307
FIELD-OF-SEARCH: 324/309, 324/307, 324/306, 324/314, 324/300, 324/312

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4851779	July 1989	DeMeester et al.	324/309
5138259	August 1992	Schmitt et al.	324/309
5581184	December 1996	Heid	324/309
5621321	April 1997	Liu et al.	324/307
5742163	April 1998	Liu et al.	324/309

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0296834A3	December 1988	EPX	
0296834A2	December 1988	EPX	
0490528A1	June 1992	EPX	
0772057A1	July 1997	EPX	
4005675A1	August 1991	DEX	
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ART-UNIT: 287
PRIMARY-EXAMINER: Arana; Louis M.
ATTY-AGENT-FIRM: Fay, Sharpe, Beall, Fagan, Minnich & McKee

ABSTRACT:

A transmitter (24) and gradient amplifiers (20) transmit radio frequency excitation and other pulses to induce magnetic resonance in selected magnetic dipoles and cause the magnetic resonance to be focused into a series of echoes (66) at each of a plurality of preselected echo positions following each excitation. A receiver (38) converts each echo into a data line. Calibration data lines having a close to zero phase-encoding are collected and used to generate correction parameters (102) for each of the echo positions. These parameters include relative echo center positions (96) and unitary complex correction vectors (106). The calibration data lines for each of the preselected positions are one-dimensionally Fourier transformed (82) and multiplied (90) by the same complex conjugate reference echo (80). These data lines are then inverse Fourier transformed (92) to generate an auxiliary data array (94). A relative echo center position is computed (96) which represents a fractional shift of the true center relative to the reference echo. A complex sum is computed (104) from the relative echo center position and normalized (106) to generate a unitary correction vector. The phase-correction parameters are used to phase-correct (116) imaging data lines. The phase-corrected imaging data lines are sorted (122) to build an image plane which is one-dimensionally Fourier transformed (128) in the phase-encoding direction to produce a final corrected image (130) for display on a monitor (134).

18 Claims, 7 Drawing figures

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 5617861 A Relevance Rank: 59

L2: Entry 3 of 3 File: USPT Apr 8, 1997

US-PAT-NO: 5617861
DOCUMENT-IDENTIFIER: US 5617861 A

TITLE: Magnetic resonance spectral analysis of the brain for diagnosis of clinical conditions

DATE-ISSUED: April 8, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ross; Brian	Altadena	CA		
Ernst; Thomas	Gundelfingen			DEX
Kreis; Roland	Boll			CHX

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Huntington Medical Research Institutes	Pasadena	CA			02

APPL-NO: 8/ 197099
DATE FILED: February 16, 1994

INT-CL: [6] A61B 5/055
US-CL-ISSUED: 128/653.2
US-CL-CURRENT: 600/410
FIELD-OF-SEARCH: 128/653.2, 128/632, 324/307, 436/173

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
5109868	May 1992	Smith et al.	128/774
5111819	May 1992	Hurd	128/653.2
5182299	January 1993	Gullans et al.	514/460
5200345	April 1993	Young	128/653.2
5218529	June 1993	Meyer et al.	364/413.01
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ART-UNIT: 335
PRIMARY-EXAMINER: Smith; Ruth S.
ATTY-AGENT-FIRM: Christie, Parker & Hale, LLP

ABSTRACT:

The present invention relates to a method for determining the concentration of metabolites in the brain using magnetic resonance spectrum techniques. The method comprising defining a volume within the brain, obtaining a magnetic resonance spectrum of the defined volume, suppressing the signal from water to reveal the spectra from metabolites, correcting the baseline, obtaining the magnetic resonance spectrum of an external standard, comparing the signal from the metabolites to the signal from the external standard and calculating the in vivo concentration of the metabolites. In one embodiment of the invention a diagnosis for Alzheimer Disease is made by comparing the relative peak heights of myo-inositol relative to creatine and N-acetylaspartate relative to creatine in the patient to the relative peak heights of myo-inositol relative to creatine and N-acetylaspartate relative to creatine for a normal population, wherein an increase in the relative peak height of myo-inositol and a decrease in the relative peak height of N-acetylaspartate is diagnostic of Alzheimer Disease.

15 Claims, 27 Drawing figures

☐ 3. Document ID: US 5994902 A Relevance Rank: 54

L2: Entry 1 of 3 File: USPT Nov 30, 1999

US-PAT-NO: 5994902
DOCUMENT-IDENTIFIER: US 5994902 A

TITLE: Chemical shift imaging with spectrum modeling

DATE-ISSUED: November 30, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Xiang; Qing-San	Vancouver			CAX
An; Li	Stafford	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
The University of British Columbia	Vancouver			CAX	03

APPL-NO: 9/ 058317
DATE FILED: April 9, 1998

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATION This application claims the benefit of U.S. provisional application Ser. No. 60/042,538, filed Apr. 10, 1997.

INT-CL: [6] G01V 3/00
US-CL-ISSUED: 324/307; 324/309, 324/314, 600/414, 436/173
US-CL-CURRENT: 324/307; 324/309, 324/314, 436/173, 600/414
FIELD-OF-SEARCH: 324/307, 324/309, 324/310, 324/311, 324/312, 324/314, 600/414, 436/173

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4797615	January 1989	Rotem et al.	324/307
5321359	June 1994	Schneider	324/307

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ART-UNIT: 287
PRIMARY-EXAMINER: Oda; Christine
ASSISTANT-EXAMINER: Shrivastav; Bry B.
ATTY-AGENT-FIRM: Christensen O'Connor Johnson & Kindness PLLC

ABSTRACT:

Chemical shift imaging with spectrum modeling (CSISM) models the general chemical shift spectrum as a system with N distinct peaks with known resonant frequencies and unknown amplitudes. Based on the N peak spectrum model, a set of nonlinear complex equations is set up that contains N+1 unknowns of two kdnds: the magnitudes of the N peaks, and a phasor map caused by main magnetic field inhomogeneity. Using these equations, the timing parameters for shifting the 180.degree. RF refocusing pulses for acquiring spin-echo images are optimally chosen. Corresponding timing parameters for other pulse sequences can also be optimized similarly. Using the chosen timing parameters, a plurality of images are acquired. Next, acquired image data are automatically processed to solve the complex linear equations. First, the phasor map is found by fitting various phasor map values over a small number of pixels, or "seeds", that are picked sparsely in a field of view. Second, from the original "seeds", the region of pixels that are picked to find the best-fit phasor map is grown into the entire field of view, based on a predetermined phase difference between the original seed and a neighboring pixel. The optimal phasor map value is then entered into the complex linear equations to derive the only unknown values at this point--the peak amplitudes. Optionally, second pass solutions of the peak amplitudes may be obtained using a smoothed phasor map value. When the equations are solved, the spectroscopic images are output.

10 Claims, 2 Drawing figures

Full | Title | Citation | Front | Review | Classification | Date | Reference

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